



TP-LINK®

User's Guide

TL-SG2216WEB

16-port Gigabit Web Smart Switch

TL-SG2224WEB

24-port Gigabit Web Smart Switch



COPYRIGHT & TRADEMARKS

Specifications are subject to change without notice. **TP-LINK®** is a registered trademark of TP-LINK Technologies Co., Ltd. Other brands and product names are trademarks or registered trademarks of their respective holders.

No part of the specifications may be reproduced in any form or by any means or used to make any derivative such as translation, transformation, or adaptation without permission from TP-LINK Technologies Co., Ltd. Copyright © 2006 TP-LINK Technologies Co., Ltd. All rights reserved.

FCC STATEMENT

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to

which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference.
- 2) This device must accept any interference received, including interference that may cause undesired operation.

EC DECLARATION OF CONFORMITY (EUROPE)

In compliance with the EMC Directive 89/336/EEC, Low Voltage Directive 73/23/EEC, this product meets the requirements of the following standards:

- EN55022
- EN55024
- EN60950

SAFETY NOTICES



Caution:

Do not use this product near water, for example, in a wet basement or near a swimming pool.

Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

TABLE OF CONTENTS

Package contents	1
Chapter 1: Introduction	2
1.1 Intended Audience	2
1.2 Agreement.....	2
1.3 Guide Overview	2
Chapter 2: Device Description	4
2.1 Introduction to the Device	4
2.2 Features and Technical Specifications	4
2.2.1 Features	4
2.2.2 Technical Specifications.....	5
Chapter 3: Mounting Device	7
3.1 Install the Device.....	7
3.1.1 Desktop or Shelf Installation	7
3.1.2 Rack Installation.....	7
3.1.3 AC Power	8
3.2 Switch Aspect Description	8
3.2.1 Front Panel.....	8
3.2.2 Back Panel.....	9
3.2.3 SFP Module	10
3.3 Note.....	10
Chapter 4: Function Description	11
4.1 System Setting.....	11

4.1.1 System Information	11
4.1.2 File Transfer	11
4.1.3 Reboot & Reset	11
4.1.4 User	12
4.2 Port Setting	12
4.2.1 Port Parameter	12
4.2.1.1 Duplex Mode	12
4.2.1.2 Flow Control	12
4.2.1.3 Port Security	12
4.2.2 Port Statistic and Port Status	13
4.2.3 Storm Control	13
4.2.4 Port Description	13
4.3 Network Setting	14
4.3.1 Switch IP Address	14
4.3.2 Aging Time and Dynamic Address Table	15
4.3.3 Static MAC Address Table	15
4.3.4 Filtering MAC Address Table	16
4.3.5 Dynamic Binding	16
4.3.6 Ping	17
4.4 VLAN Setting	17
4.4.1 VLAN Mode	17
4.5 Port Trunking	19
4.6 Priority Setting	19
4.6.1 Priority Mode	19
4.6.2 Port-Based Priority	20
4.6.3 Port Default Priority	20

4.6.4 802.1p Priority	20
4.7 Port Mirroring	20
4.8 Virtual Cable Test	20
Chapter 5: WEB Management.....	22
5.1 Overview	22
5.2 Connecting to the Device.....	22
5.2.1 Getting Started	22
5.2.2 Login the Switch.....	26
5.3 Setting the Device.....	26
5.3.1 System Setting	30
5.3.1.1 System Information	30
5.3.1.2 File Transfer	31
5.3.1.3 Reboot & Reset.....	32
5.3.1.4 User.....	33
5.3.2 Port Setting	33
5.3.2.1 Port Parameter.....	33
5.3.2.2 Port Statistic.....	36
5.3.2.3 Port Status	38
5.3.2.4 Storm Control.....	39
5.3.2.5 Port Description	40
5.3.3 Network Setting.....	41
5.3.3.1 Switch IP Address.....	41
5.3.3.2 Static MAC Address.....	42
5.3.3.3 Filtering MAC Address	44
5.3.3.4 Dynamic Binding.....	45
5.3.3.5 Bound MAC Address	48

5.3.3.6 Aging Time	49
5.3.3.7 Ping	50
5.3.4 VLAN Setting	50
5.3.4.1 VLAN Mode.....	50
5.3.4.2 Port VLAN Setting.....	51
5.3.4.3 Tag VLAN Global Setting.....	53
5.3.4.4 Tag VLAN Setting.....	54
5.3.4.5 MTU VLAN Setting	56
5.3.5 Port Trunking.....	57
5.3.6 Priority Setting.....	57
5.3.6.1 Priority Mode.....	58
5.3.6.2 Port-Based Priority.....	58
5.3.6.3 Port Default Priority.....	59
5.3.6.4 802.1p Priority Class.....	59
5.3.7 Port Mirroring	60
5.3.8 Virtual Cable Test.....	61
Appendix A Pin Explain For RJ-45 Connector	63
Appendix B Table of Factory Defaults	65
Appendix C Table of Function Differences of Switch Family	67

Package contents

The following contents should be found in your box:

- One Web Smart Switch
- One AC power cord
- User Guide
- Two mounting brackets and other fittings



Note:

If any of the listed contents are damaged or missing, please contact the retailer from whom you purchased the TL-SG2216WEB/TL-SG2224WEB Web Smart Gigabit Switch Family for assistance.

Chapter 1: Introduction

Thanks for choosing the TL-SG2216WEB/TL-SG2224WEB Web Smart Gigabit Switch Family! The switch family provides a friendly management interface and excellent performance.

1.1 Intended Audience

This guide is intended for network administrators familiar with IT concepts and network terminology.

1.2 Agreement

Due to the similarity in function of the TL-SG2216WEB/TL-SG2224WEB Web Smart Gigabit Switch Family, the TL-SG2216WEB model is selected to illustrate the usage of this switch family. The “switch” referred in this guide indicates the TL-SG2216WEB/TL-SG2224WEB Web Smart Gigabit Switch Family.

1.3 Guide Overview

This user guide is divided into the following sections to provide concise information for configuring, and managing the TP-Link device:

Section 1: Introduction.

Section 2: Device Description -- Provides an overview about the switch family.

Section 3: Mounting Device -- Describes the mounting procedure of the switch.

Section 4: Function Description -- Describes the functions supported by the switch family and presents the network concepts referred in this guide.

Section 5: WEB Management – Give an explanation to the terms in WEB interface and describes the configuring suggestions of the switch.

Appendix A: Pin Explanation for RJ-45 Connector

Appendix B: Table of Factory Defaults

Appendix C: Table of Function Differences of Switch Family

Chapter 2: Device Description

2.1 Introduction to the Device

The TL-SG2216WEB/TL-SG2224WEB Web Smart Gigabit Switch Family is compliant with IEEE802.3 Ethernet protocols. The EIA-standardized framework and smart configuration capacity can provide flexible solutions for a variable scale of networks.

This switch family is equipped with a powerful management interface, via which system, port, network, VLAN, trunk and priority can be configured.

The TL-SG2216WEB/TL-SG2224WEB Web Smart Gigabit Switch Family provides 16/24 10/100/1000M Gigabit Ethernet ports and 2/2 SFP ports respectively, which extends the connection area and increases the networking flexibility. The two SFP ports share the inner logical ports with the last two Gigabit Ethernet ports, if the SFP port is plugged, the corresponding Gigabit Ethernet port is automatically disabled. A detail description can be referred in phase 5.3.2.1.

2.2 Features and Technical Specifications

2.2.1 Features

- Compliant with IEEE802.3, IEEE802.3u, IEEE802.3ab and IEEE802.3z Standards
- IEEE 802.3x flow control for full-duplex
- Back pressure flow control for half-duplex
- Store-and-Forward switching method
- Support N-Way adaptive mode
- Support up to 200 meters of Cat. 5 cables at the transmission speed of

10M

- Support MAC address table of 8K entries
- Support MAC address learning and aging time
- Support port-based VLAN and IEEE802.1Q tag VLAN
- Support trunks
- Support management via WEB browser
- Support port-based priority and IEEE 802.1p priority
- Support static MAC address and filtering MAC address
- Support dynamic binding of MAC address
- Support port security, storm control and port monitoring
- Support virtual cable test
- Support static switch IP address and dynamic switch IP address through DHCP client
- Support system upgrading, configuration uploading and backup through TFTP server
- Support extra long frames (Jumbo frames) of up to 10K bytes

2.2.2 Technical Specifications

Standards	IEEE802.3 10Base-T Ethernet
	IEEE802.3u 100Base-TX/100Base-FX Fast Ethernet
	IEEE802.3ab 1000Base-T Gigabit Ethernet
	IEEE802.3z 1000Base-X Gigabit Ethernet
	IEEE802.3x Flow Control
Port	RJ-45 ports, which support MDI/MDIX, and some SFP ports are provided (Appendix C can be referred for details)
VLAN Mode	IEEE802.1Q Tag VLAN Mode
	Port-based VLAN Mode
	MTU VLAN Mode

Transmission Medium		10Base-T: UTP/STP of Cat. 3 or above
		100Base-TX: UTP/STP of Cat. 5
		100Base-FX: MMF or SMF SFP Module (OPTIONAL)
		1000Base-T: 4-pair UTP ($\leq 100\text{m}$) of Cat. 5 or above
		1000Base-X: MMF or SMF SFP Module (OPTIONAL)
LED	Power	Indicates whether power is supplied or not
	Port	10/100/1000Mbps RJ-45 port: Link/Act and 1000Mbps LED
		SFP port: 1000Mbps Link/Act LED
Dimensions (L×W×H)		440mm×260mm×44mm
Operating Environment		Operating Temperature: 0°C ~ 40°C
		Storage Temperature: -40°C ~ 70°C
		Operating Humidity: 10% ~ 90% RH
		Storage Humidity: 5% ~ 95% RH
Power Supply		AC 100-240V~ 50-60Hz

Chapter 3: Mounting Device

3.1 Install the Device

Installation Precautions:

1. Ensure that the surface on which the device is placed is adequately secured to prevent it from becoming unstable and/or falling over.
2. Ensure that the power outlet is placed within 1.5 m (5 feet) of the device.
3. Ensure that the device is connected safely to the power outlet with the AC power cable.
4. Ensure that the device is placed in ventilated place.

3.1.1 Desktop or Shelf Installation

1. Place the switch on the desktop with its bottom upturned.
2. Attach the supplied rubber feet on the bottom at each corner of the switch.
3. Turn over the switch and place it on the desktop.

3.1.2 Rack Installation

The device can be mounted in an EIA standard-sized, 19-inch rack, which can be placed in a wiring closet with other equipment.

1. Install the supplied rack-mounting bracket on each side of the device, using the supplied screws. The following figure illustrates where to mount the brackets.

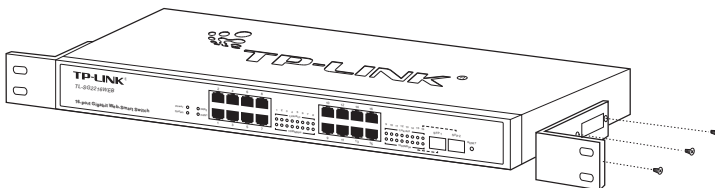


Figure 3-1 Mounting Brackets

2. Insert the switch into the rack.
3. Fix the switch to the rack with the rack screws (not provided).

3.1.3 AC Power

The switch can be used with an AC power supply 100 to 240V AC, 50 to 60Hz. The switch's power supply will adjust to the local power source automatically.

3.2 Switch Aspect Description

3.2.1 Front Panel

The front panel of TL-SG2216WEB is configured as follows:

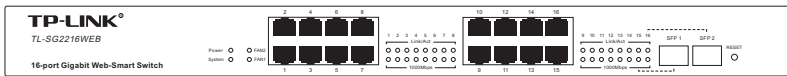


Figure 3-2. TL-SG2216WEB Front Panel

- **16 10/100/1000Mbps RJ-45 GIGA ports:** designed to connect to the device with a bandwidth of 10M, 100M or 1000M. Each has a corresponding Link/Act and 1000Mbps LED.
- **SFP ports:** designed to install the SFP module. It uses the Link/Act LED of the GIGA ports with which compose a combo port (see 5.2.1 for details of combo ports).
- **Reset Button:** Press this button for three seconds to the reset software setting back to factory default setting.
- **LEDs**
 - 1) **Power LED:** Will be solid red when power is supplied to the switch and is operating normally.
 - 2) **System LED:** Will flash green when the CPU of the switch is working

normally.

- 3) **1000Mbps LED**: When a GIGA port is connected to a 1000Mbps device, the corresponding LED turns on in solid green; when the port is connected to a 10/100Mbps device, the LED turns off.
- 4) **Link/Act LED**: Will be solid green when a valid link is established on the port; Flashes green when packet transmission or reception is occurring on the port.
- 5) **FAN LED**: FAN1 indicates the right fan, FAN2 indicates the left fan, and they will be solid green when the corresponding fan is operating normally.

Following shows the front panel of TL-SG2224WEB:

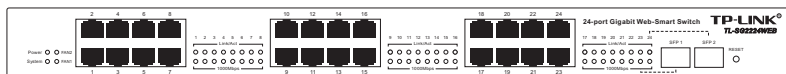


Figure 3-3 TL-SG2224WEB Front Panel

3.2.2 Back Panel

The back panel of the switch is configured as follows:



Figure 3-4 TL-SG2216WEB/TL-SG2224WEB Back Panel

- **AC Power Connector**: This is a three-pronged connector that supports the power cable. Plug in the female connector of the provided power cable into this connector, and the male into a power outlet.

3.2.3 SFP Module

The SFP port accommodates a standard SFP module, support 100Base-FX and 1000Base-X Ethernet standard. (SFP optics is optional)

The SFP module supports hot-plugging. Plug the SFP module into the SFP port and the switch will identify it automatically.

3.3 Note

- The surface on which the switch is placed should be adequately secured to prevent it from becoming unstable and/or falling over.
- Ensure that the power source circuits are properly grounded.
- Ensure that the power cable, extension cable, and/or plug is not damaged.
- Ensure that the switch is not exposed to water.
- Ensure that the switch is not exposed to radiators and/or heat sources.
- Do not push foreign objects into the switch, as it may cause a fire or electric shock.
- Allow the switch to cool before removing covers or touching internal equipment.
- Use the switch only with approved equipment. If the switch is connected to other network device with UTP cable, ensure the cable is not more than 100 meters length.

Chapter 4: Function Description

This section presents the network concepts referred in switch function description.

4.1 System Setting

System setting contains the following topics: displaying and configuring the switch information, upgrading firmware, backuping and loading configuration, rebooting and soft-resetting, configuring username and password.

4.1.1 System Information

The system information contains a hardware version, software version, system description, system name, system location, contact information and run time.

4.1.2 File Transfer

The TL-SG2216WEB/TL-SG2224WEB Web-Smart Switch Family is equipped with a configuration backup function, configuration loading and system upgrading.

The configuration file and executive file are transferred in TFTP protocol. TFTP (Trivial File Transfer Protocol) is dedicated to transferring files between two network stations. It's based on UDP protocol.

4.1.3 Reboot & Reset

The "Reset" indicates "Soft-reset" here. Soft-resetting restores the switch configuration to default except the switch IP address.

4.1.4 User

The username and password can be modified in order to exclude illegal users.

4.2 Port Setting

4.2.1 Port Parameter

4.2.1.1 Duplex Mode

Ports have duplex modes, 10M HD, 10M FD, 100M HD, 100M FD and 1000M FD.

The First part indicates the transmission rate and the second part indicates the duplex mode.

- **HD:** half-duplex, the port supports transmission between the device and the client in only one direction at a time.
- **FD:** full-duplex, the port supports transmission between the device and its link partner in both directions simultaneously.

Switch support auto negotiation, it's a protocol between two link partners that enables a port to advertise its transmission rate and duplex mode to its partner.

4.2.1.2 Flow Control

Flow control enables lower speed devices to communicate with higher speed devices. This is implemented by the higher speed device refraining from sending packets.

4.2.1.3 Port Security

If the port security is enabled, it will not learn new MAC address and only

transmit the frames from the MAC address list in the port's static MAC address table.

4.2.2 Port Statistic and Port Status

Port Statistic calculates the statistics of each port, such as how many frames, error frames, broadcast frames it has received, and so on.

Port Status indicates whether the port is linkup, linkdown or disabled, what speed and duplex mode it is working on, and whether flow control is enabled or disabled.

4.2.3 Storm Control

Storm control limits the amount of multicast, broadcast and UL (addresses that have not been learned) frames accepted and forwarded by the device. When Layer 2 frames are forwarded, broadcast, multicast and UL frames are flooded to all ports on the relevant VLAN. This occupies bandwidth, and loads all nodes on all ports.

A Storm is a result of an excessive amount of these frames simultaneously transmitted across a network by a single port. Forwarded message responses are heaped onto the network, straining network resources or causing the network to time out. Storm control is enabled for all ports by defining the packet type and the rate at which the packets are transmitted. The system measures the incoming defined frame rates on each port, and discards the frames when the rate exceeds a user-defined rate.

4.2.4 Port Description

Use a description word to indicate the port.

4.3 Network Setting

The network module provides setting switch IP address, dynamic binding and aging time, configuring static MAC address and filtering MAC address, displaying dynamic bound address and ping functions.

4.3.1 Switch IP Address

An IP address is indispensable for a switch to be accessed. The TL-SG2216WEB/TL-SG2224WEB Web-Smart Switch Family provides the configuration interface of IP address, netmask and default gateway.

DHCP (Dynamic Host Configuration Protocol) is dedicated for the DHCP client to obtain IP configuration information from the DHCP server. Two types of information are included in IP configuration information. One type is specific configuration information; another is IP address parameter. DHCP is based on client-server mode. The network station that offers the IP configuration information is called DHCP server.

Make sure that a DHCP server is correctly connected to the network, enable the DHCP client function of the switch, then the switch will automatically obtain IP address, netmask and default gateway from the DHCP server.

If more than one DHCP servers are available in the network, the switch will choose one according to a specific algorithm.



Notice:

If no DHCP server is present in the network, the DHCP client fails to get IP configuration information, the switch then restores the IP parameters to default in several minutes to ensure a valid IP address being equipped.

4.3.2 Aging Time and Dynamic Address Table

A dynamic MAC address table is maintained inside the switch. A MAC address is the physical address of a network device; it is six-bytes long and should be hole in a subnet. A network device can be identified by its MAC address.

A dynamic address table entry contains two items: MAC address and its corresponding switch port. The dynamic address table is volatile. The dynamic address entry begins to age once it is added; it will be purged if it isn't renewed in a specified time length, which is defined as aging time.

The aging time ranges from 0 to 630 seconds for this switch family.

The default value is 300 seconds. Dynamic address table entry won't age if 0 is set. The aging time precision is 15 seconds.

4.3.3 Static MAC Address Table

A static MAC address table entry contains a MAC address and its corresponding switch port. All the packets taking that MAC address as their destination will be forwarded to the corresponding switch port.

The static MAC address won't age, which differs from the dynamic MAC address. The static MAC address table entry is always valid before it is deleted.

Suppose an entry, whose MAC address is 000AEB000001 and corresponding port number is 1, is added to the static MAC address table. All the packets routing to the address of 000AEB000001 egress for the switch port 1. This static entry obliges the device of 000AEB000001 to be connected to port 1; otherwise, that device cannot be accessed. Static MAC addresses are free of

MAC learning, which enhances the efficiency of packets forwarding. The MAC addresses already configured in static MAC address table cannot be added to filtering MAC address table.

The static MAC address table capacity of different type of switches may be different. Appendix C lists the difference.

4.3.4 Filtering MAC Address Table

A filtering MAC address excludes a device from being accessed through the switch. All the packets taking the filtering MAC address as their destination will be discarded. The filtering MAC address is applicable to all the switch ports. The configured filtering MAC address can neither be added to static MAC address table, nor be bound by switch ports.

4.3.5 Dynamic Binding

A switch port in dynamic binding state can bind a specified number of MAC address. Once the specified number is reached, the port transfers into secure state automatically and stops binding MAC addresses. The bound MAC addresses won't age, they can be removed by disabling the dynamic binding or rebooting the switch.

The function of dynamic binding causes the switch port to acknowledge the devices connecting to it after startup, and stores the connections (through binding MAC addresses) in static state. This enhances the efficiency of packets forwarding and limits the connecting device number of the switch port. Reboot the switch after configuring the dynamic binding function. The switch will acknowledge and bind the latest connecting devices. If the switch is managed through remote connection, please add the MAC address of the

management computer or that of the default gateway to the static MAC address table; otherwise, the management channel may be broken down.

4.3.6 Ping

The ping function is to test the connectedness of the link between the switch and destination.

4.4 VLAN Setting

VLANs are logical subgroups with a Local Area Network (LAN) that combine user stations and network devices into a single unit, regardless of the physical LAN segment to which they are attached. VLANs allow network traffic to flow more efficiently within subgroups.

VLANs use software to reduce the amount of time it takes for network changes, additions, and moves to be implemented.

VLANs can be created per unit, per device, or through any other logical connection combination, since they are software-based and not defined by physical attributes. VLANs function at Layer 2. Since VLANs isolate traffic within the VLAN, a Layer 3 router working at a protocol level is required to allow traffic flow between VLANs. Layer 3 routers identify segments and coordinate with VLANs. VLANs are Broadcast and Multicast domains. Broadcast and Multicast traffic is transmitted only in the VLAN in which the traffic is generated.

4.4.1 VLAN Mode

There are 3 types of VLAN modes supported in the switch:

1) Port VLAN

VLANs are divided basic on ports.

2) IEEE802.1Q Tag VLAN

The IEEE802.1Q protocol defines a new format of the frame; it adds a tag header in the original Ethernet frame, as follows:

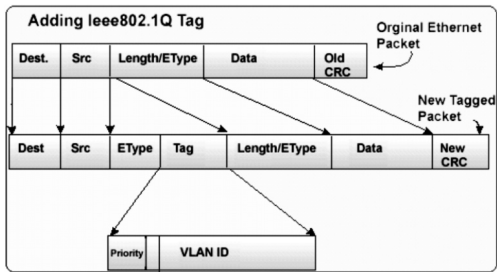


Figure 4-1. IEEE802.1Q frame

IEEE802.1Q Tag VLAN is divided by VLAN ID (VID). On receiving a frame, the switch checks the VID in the tag header of the frame to decide which VLAN it belongs to. If the receiving frame doesn't contain the tag header, the switch will assign a tag to the frame, using the PVID of the port as its VID.

3) MTU VLAN

MTU VLAN (Multi-Tenant Unit VLAN) define an uplink port, the uplink port will buildup several VLANs with each of the other ports. Each VLAN contains two ports, the uplink port and one of the other ports in the switch, so the uplink port can communicate with any other ports but other ports can't communicate with each other.

4.5 Port Trunking

Trunking refers to Link Aggregation. It optimizes port usage by linking a group of ports together to form a single trunk (aggregated groups). The bandwidth of the Trunk is the sum of bandwidth of its member port.

There are some rules on using Trunk:

- 1) Before setting the Trunk, its member ports should be divided to the same VLAN, and have the same PVID and drop the untagged frame rule. Change of the Trunk setting will not affect the VLAN setting. Trunks can not be set if the switch is in MTU VLAN mode
- 2) The Trunk member ports can't enable port security and can't be set as mirror or mirrored port.
- 3) All of the Trunk member ports should be connected correctly; otherwise some ports will not be able to work.

4.6 Priority Setting

The priority mode of the switch can be set to "Disable", "Port-Based" or "IEEE802.1p".

4.6.1 Priority Mode

Three priority modes (disable, port-based and IEEE802.1p) are provided for this switch family.

The priority rule can be set to "Weighted" or "Fixed". When the priority rule is configured as "weighted", a 1,2,4,8 weighting is applied to forward packets. When "fixed" is selected, all packets with top priority egress for a switch port until that priority's queue is empty, then the packets with next lower priority.

4.6.2 Port-Based Priority

Four priority classes (lowest, lower, higher and highest) are available for a switch port in port-based priority mode. The priority class of the port is applied to the all packets entering from the port.

4.6.3 Port Default Priority

If IEEE802.1p priority mode is configured, when a switch port receives an untagged frame (a frame without priority tag), the port's default priority tag will be inserted into the frame before any other process.

4.6.4 802.1p Priority

In IEEE802.1p priority mode, all packets are classified into four priority classes (lowest, lower, higher and highest) according to the embedded priority tag. If an untagged frame is received, the default priority tag of the port will be attached.

4.7 Port Mirroring

Port mirroring monitors and mirrors network traffic by forwarding copies of incoming and outgoing packets from one port to a monitoring port. Port mirroring enables switch performance monitoring.

Network administrators can configure port mirroring by selecting a specific port from which to copy all packets, and other ports to which the packets copied.

4.8 Virtual Cable Test

The virtual cable test feature uses Time Domain Reflectometry (TDR) to test

the quality of the cables connected to the port. Some of the possible problems than can be diagnosed include opens, shorts, cable impedance mismatch, bad connectors, termination mismatch, and bad magnetics. It can also test the distance to the problem location, with the precision of ± 1 meter.

Chapter 5: WEB Management

5.1 Overview

The Web-Smart switch is managed via WEB pages. The smart and friendly interfaces make the switch management an easy job.

5.2 Connecting to the Device

5.2.1 Getting Started

Before connecting to the WEB server (switch), the installation of WEB browser, which supports JavaScript, must be completed in the computer.

Due to the difference of parsing syntax, the WEB page display may differ between variable WEB browsers. Microsoft Internet Explorer of version 5.0 or higher is recommended. If Netscape is selected, please ensure the latest version. To obtain excellent display quality, a screen resolution of 1024 x 768 or higher is necessary.

The appropriate configuration of WEB browser must be ensured before switch management. An example of configuration using IE on Windows XP is given below.

Firstly, select Tool->Internet Options on the menu, a dialog will pop up:

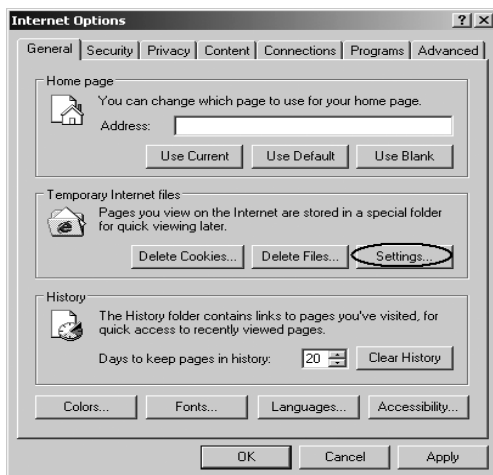


Figure 5-1 Internet Options Dialog

Secondly, click the “Settings” button hinted in figure 5-1, a new dialog will display:



Figure 5-2 Settings Dialog

In case of IE5.0, please check the option “Every visit to the page”; otherwise, some wrong information may display in WEB pages. If the IE version is 6.0, “Every visit to the page” or “Automatically” are both appropriate.

Click the “OK” button and complete this setting.

Thirdly, click the “Security” label of “Internet Options” dialog; press the “Custom Level” button hinted in figure 5-3.

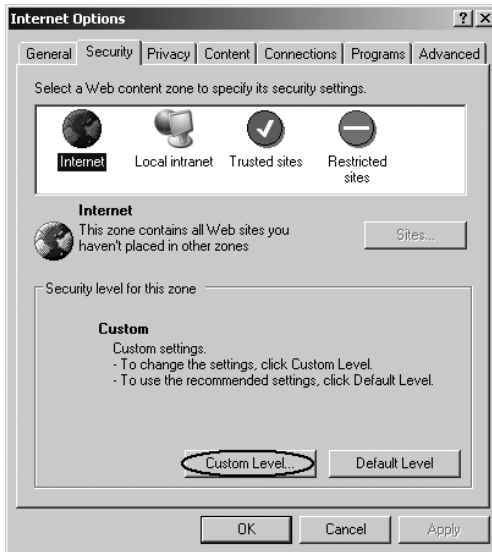


Figure 5-3 Internet Options Dialog

A dialog will display as below.

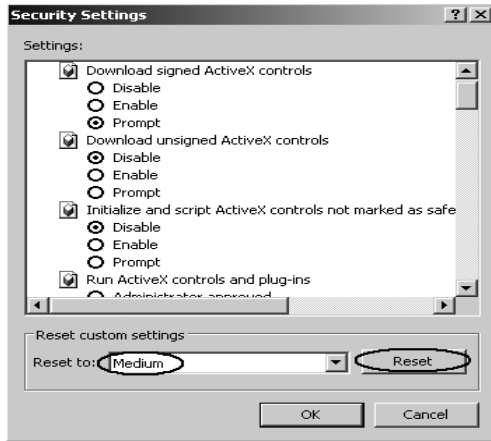


Figure 5-4 Security Settings

Fourthly, Select the “Medium” option of the combo box indicated in figure 5-4, click the “Reset” button, and click “OK” to quit.

Fifthly, right-click the mouse on desktop, select the “Display Properties” in the popup menu, a new dialog will display:

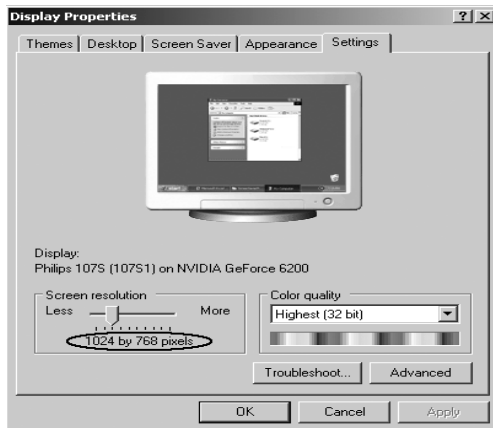


Figure 5-5 Resolution Settings

Click the “Settings” label, set the screen resolution to 1024 x 768 and click “OK”. All the necessary IE configuration is completed.

5.2.2 Login the Switch

Supposing the switch IP address is set as 192.168.0.1, open a web browser and enter http://192.168.0.1 in the address location, and then the following dialog page appears:

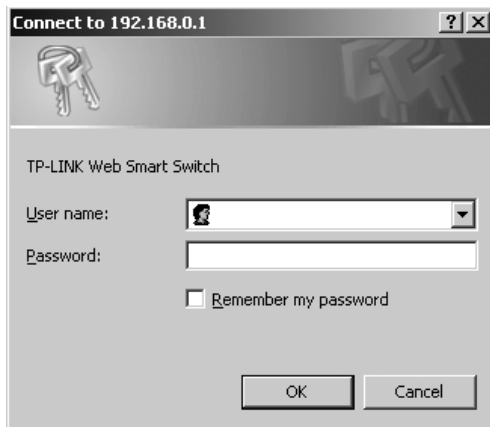


Figure 5-6 Login Dialog

Enter username and password (default value are both "supervisor") to login the switch configuration main page.

5.3 Setting the Device

After logging into the switch, the main page appears as the following. It contains three parts:

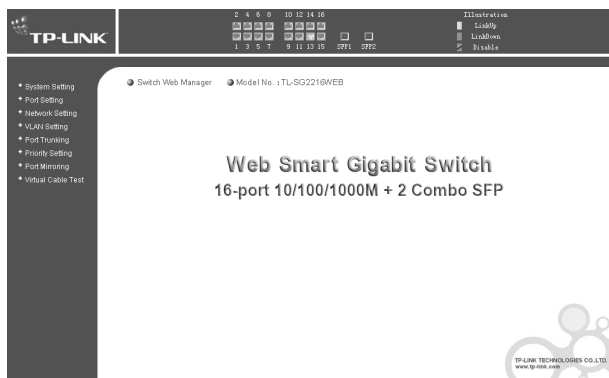


Figure 5-7 TL-SG2216WEB Main Page

- 1) The main part of the page is the main window to display the configuration page.
- 2) The Port Led Indicator table lies at the top of the page. It provides a visual representation of the ports on the switch front panel to display the status of the ports. The ports, signed with number are the Giga ports, signed with SFP are the SFP ports. The green icon indicates that the port is linked; the gray icon indicates that the port is not linked; the gray icon with a black bar indicates that the port is disabled; for the SFP port, the blue icon indicates that the SFP module hasn't been installed.



Figure 5-8 Port Led Indicator Table (SFP uninstalled)



Figure 5-9 Port Led Indicator Table (SFP installed)

Click on the icon of the port to open a new window, which shows the details status of the port, as following:

Port ID :	1
Port Status :	Linkup
Port Speed :	1000Mbps
Duplex Mode :	FD
Flow Control :	Disable

Figure 5-10a Port Status Table

Port ID :	SFP1
Port Status :	--
Port Speed :	--
Duplex Mode :	--
Flow Control :	--
Moudle Type :	Not install

Figure 5-10b SFP Status Table (uninstalled)

Port ID :	SFP1
Port Status :	Linkup
Port Speed :	1000Mbps
Duplex Mode :	FD
Flow Control :	Disable
Moudle Type :	Company : TP-LINK Model : TL-SM311LM

Figure 5-10c SFP Status Table (installed)

- 3) On the left side of the page is the menu table. It contains 8 main menus. Each menu has a submenu. Click on a menu, it will open its submenu and the main window displays the configuration page of the submenu list first, click on the submenu you want to configure to open the corresponding configuration page. The menu structure is as follows:

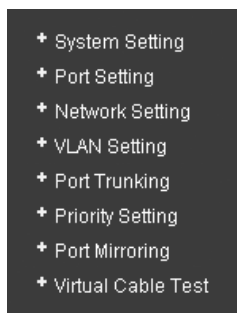


Figure 5-11 Main Menu

- **System Setting:** System Information, File Transfer, Reboot & Reset, and User.
- **Port Setting:** Port Parameter, Port Statistic, Port Status, Storm Control, and Port Description.
- **Network Setting:** Switch IP Address, Static MAC Address, Filtering MAC Address, Dynamic Binding, Bound MAC Address, Aging Time, and Ping.
- **VLAN Setting:** VLAN Mode, Port VLAN Setting, Tag VLAN Global Setting, Tag VLAN Setting, MTU VLAN Setting.
- **Port Trunking:** Port Trunking.
- **Priority Setting:** Priority Mode, Port-Based Priority, Port Default Priority, 802.1p Priority Class.
- **Port Mirroring:** Port Mirroring.
- **Virtual Cable Test:** Virtual Cable Test.

The following shows main page of the TL-SG2224WEB:

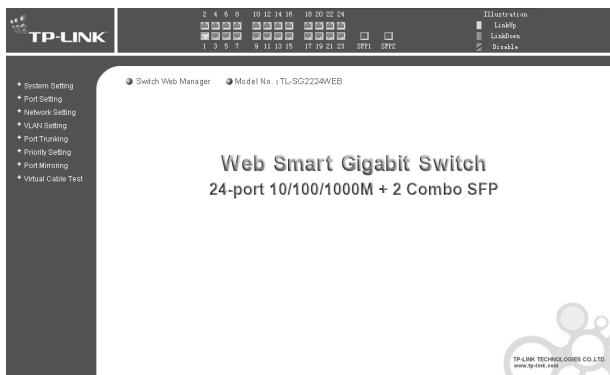


Figure 5-12 TL-SG2224WEB Main Page

5.3.1 System Setting

System setting contains four topics: system information, file transfer, reboot & reset and user.

5.3.1.1 System Information

This page contains the following fields:

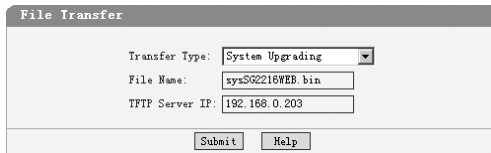
System Information	
Hardware Version:	TL-SG2216WEB 1.0
Software Version:	1.1.0 Build 20051114 Rel.53763
System Description:	16G Web-Smart Switch
System Name:	<input type="text"/>
System Location:	<input type="text"/>
Contact Information:	<input type="text"/>
Run Time:	0 Day - 0 Hour - 49 Min - 9 Sec
Notice: At most 31 letters or numbers can be held in system name, system location and contact information.	
<input type="button" value="Submit"/> <input type="button" value="Refresh"/>	

Figure 5-13 System Information

- **Software Version:** Displays the installed software version number.
- **Hardware Version:** Displays the installed device hardware version number.
- **System Description:** Displays the device model number and name.
- **System Name:** Defines the user-defined device name.
- **System Location:** Defines the location where the system is currently running.
- **Contact Information:** Defines the contact information of switch manager.
- **Run time:** Shows the run time since last startup.

5.3.1.2 File Transfer

This page contains the following fields:



Transfer Type:	System Upgrading
File Name:	sysSG2216WEB.bin
TFTP Server IP:	192.168.0.203

Submit Help

Figure 5-14 File Transfer

- **Transfer Type:** Lists three types of file transfer supported by the switch.
- **File Name:** Identifies the file to be loaded or to be backed up on TFTP server.
- **TFTP Server IP:** Indicates the IP address of TFTP server.



Further explanation

File transfer types:

- **System Upgrading:** Means downloading the executable file from TFTP server to switch and upgrading the system.

- **Configuration Backup:** Means backing up the current configuration of the switch to TFTP server.
- **Configuration Loading:** Means downloading the configuration from TFTP server to the switch and update it.

**Notice:**

- 1) Please make sure the target file exists on TFTP server before downloading.
- 2) Please make sure the TFTP server is in operation.
- 3) Breaks should be avoided in file transfer; otherwise, the switch may be damaged.

5.3.1.3 Reboot & Reset

This page is shown below.

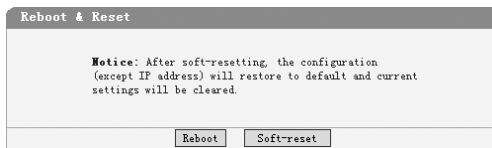


Figure 5-15 Reboot & Reset

A prompt will display if a button is pressed. For example, if the button “Soft-reset” is pressed, a message box will be activated as showed in figure 5-16.

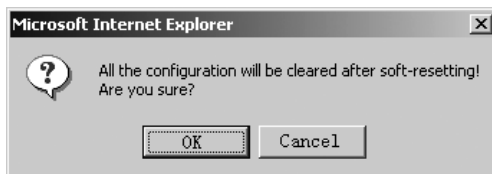
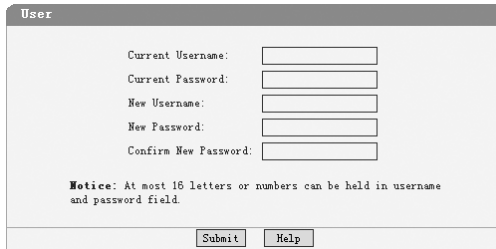


Figure 5-16 Message Box

5.3.1.4 User

This page provides the interface of configuring username and password.



The screenshot shows a web form titled "User" with the following fields and controls:

- Current Username:
- Current Password:
- New Username:
- New Password:
- Confirm New Password:

Below the fields is a notice: **Notice:** At most 16 letters or numbers can be held in username and password field.

At the bottom of the form are two buttons: "Submit" and "Help".

Figure 5-17 User Configuration

You are kindly suggested to retype the new password in "Confirm new password" box instead of copying in order to avoid mistakes.



Notice:

- 1) Only letters, numbers and punctuations can be inputted into username and password field, other characters are considered illegal. The length of username and password ranges from 1 to 16 characters.
- 2) The initial username and password is supervisor/supervisor.

5.3.2 Port Setting

5.3.2.1 Port Parameter

This page contains the following fields:

Port Parameter					
Port	Trunk	Port Status	Port Security	Flow Control	Duplex Mode
1	--	Enable	Disable	Disable	Auto
2	--	Enable	Disable	Disable	Auto
3	--	Enable	Disable	Disable	Auto
4	--	Enable	Disable	Disable	Auto
5	T2	Enable	Disable	Disable	Auto
6	T2	Enable	Disable	Disable	Auto
7	--	Enable	Disable	Disable	Auto
8	--	Enable	Disable	Disable	Auto
9	--	Enable	Disable	Disable	Auto
10	--	Enable	Disable	Disable	Auto
11	--	Enable	Disable	Disable	Auto
12	--	Enable	Disable	Disable	Auto
13	--	Enable	Disable	Disable	Auto
14	--	Enable	Disable	Disable	Auto
15	--	--	--	--	--
16	--	Enable	Disable	Disable	Auto
SFP1	--	Enable	Disable	Disable	Auto
SFP2	--	--	--	--	--
All Ports	--	--	--	--	--

Figure 5-18 Port Parameter

- **Port Status:** Indicates whether the port is operational or non-operational." Enable" Indicates that the port is operational and "Disable" Indicates the port is non-operational. If a port is unused for a long time, it can be set to be non-operational to cut down the energy cost.

**Notice:**

- 1) You can't manage the switch via the port, which is non-operational, please set the value of the management port to "enable".
- 2) SFP port is a combo port sharing a connection with a Giga port. In TL-SG2216WEB, SFP1 and port 15 compose a combo port, SFP2 and port 16 compose a combo port; In TL-SG2224WEB, SFP1 and port 23 compose a combo port, SFP2 and port 24 compose a combo port. For a

combo port, only one operation type can be active at a time, if both ports are connected at the same time, the SFP port has the priority of being active. The combo port uses the same configuration, for example, in TL-SG2216WEB, if port 15 is active and the Port Status parameter is set to "Disable", when the SFP1 is active, its Port Status parameter will also be "Disable".

- **Port Security:** "Enable" Indicates the port will not learn new MAC address and only transmit the frames from the MAC address it has learned." "Disable" Indicates it will learn new MAC address.

**Notice:**

If you haven't set the static MAC address, you can't set all of the port security to be enabled, which will cause to not able to manage the switch.

- **Flow Control:** Indicates whether the flow control is enabled or disabled.

**Notice:**

If the port is working at half duplex, the settings of flow control are divided into several groups (each group includes 6 ports), for example, port 1 to 6 are assigned to group 1. The ports of the same group share the same flow control settings, so when you modify the setting of one port, those of the other ports are changed correspondingly.

- **Duplex Mode:** Possible field values are Auto, 10M HD, 10M FD, 100M HD, 100M FD and 1000M FD, "HD" stands for half-duplex and "FD" stands for full-duplex. "Auto" means auto negotiation.

**Notice:**

Though the SFP module support hot-plugging, but the configuration of Duplex Mode could not change automatically, after switching between UTP, 100M SFP and 1000M SFP on the combo port, please modify its Duplex Mode manually or re-electrify the switch to make sure the configuration is correct. The 100M SFP should be set to "100M FD" and the 1000M SFP should be set to "AUTO" or "1000M FD".

**Further explanation:**

- 1) By operating on fields in the All Ports line expediently, you can set the values of all ports in the corresponding field. Some other setting pages offer the same function.
- 2) Parameters of Trunk member ports are configured with default values (see the Appendix B table) and cannot be configured here (see port 5 and 6 in the figure for example).

5.3.2.2 Port Statistic

This page displays the port statistic, it contains the following entries:

Port Statistic	
Port: 1	<input type="button" value="Refresh"/> <input type="button" value="Reset"/> <input type="button" value="Help"/>
Tx Collisions: 0	Tx Ucast: 2271
Tx Mcast: 14	Tx Bcast: 89
Rx (G Pkts): 1335	Rx (B Bytes): 0
Rx Ucast: 1321	Rx UnderSz: 0
Rx Mcast: 0	Rx OverSize: 0
Rx Bcast: 14	Rx Jabber: 0
64 B: 848	65to127 B: 88
128to255 B: 33	256to511 B: 12
512to1023 B: 30	Rx Bytes: 456859

Figure 5-19 Port Statistic

- **Tx Collisions:** The number of collision events seen by the MAC. This counter is applicable in half-duplex only.
- **Tx Ucast:** The number of frames sent that have a unicast destination MAC address.
- **Tx Mcast:** The number of frames sent that have a multicast destination MAC address.
- **Tx Bcast:** The number of frames sent that have a broadcast destination MAC address.
- **Rx (G Pkts):** The number of good frames received.
- **Rx Ucast:** The number of frames received that have a unicast destination MAC address.
- **Rx Mcast:** The number of frames received that have a multicast destination MAC address.
- **Rx Bcast:** The number of frames received that have a broadcast destination MAC address.
- **Rx (B Bytes):** The sum of bytes of frames received with an invalid length. The frames with the length more than 1522 octets are counted as 1522 octets ones.
- **Rx UnderSz:** Total frames received with a length of less than 64 octets but with a valid FCS.
- **Rx OverSize:** Total frames received with a length of more than max size octets but with a valid FCS.
- **Rx Jabber:** Total frames received with a length of more than max size octets but with an invalid FCS.
- **64 B:** Total frames received and transmitted with a length of exactly 64 octets, including those with errors.
- **65 to 127 B:** Total frames received and transmitted with a length of

between 65 and 127 octets inclusive, including those with errors.

- **128 to 255 B:**Total frames received and transmitted with a length of between 128 and 255 octets inclusive, including those with errors.
- **256 to 511 B:**Total frames received and transmitted with a length of between 256 and 511 octets inclusive, including those with errors.
- **512 to 1023 B:**Total frames received and transmitted with a length of between 512 and 1023 octets inclusive, including those with errors.
- **RX Bytes:** The sum of bytes of frames received, not including those with errors.



Notice:

Each statistic counter has the max numerical value of about $1.8e+19$, in excess of this value, the counter will reset to zero. You can also click on the “Reset” button to reset all of the statistic counters to zero.

5.3.2.3 Port Status

This page display the port status, it contains the following fields:

Port Status				
<input type="button" value="Refresh"/>				
Port	Port Status	Speed (Mbps)	Duplex Mode	Flow Control
1	Linkdown	--	--	--
2	Linkup	1000	Full Duplex	Disable
3	Linkup	1000	Full Duplex	Disable
4	Linkup	1000	Full Duplex	Enable
5	Linkup	1000	Full Duplex	Enable
6	Linkup	1000	Full Duplex	Disable
7	Linkup	1000	Full Duplex	Disable
8	Linkup	1000	Full Duplex	Disable
9	Linkup	1000	Full Duplex	Enable
10	Linkup	1000	Full Duplex	Enable
11	Linkup	1000	Full Duplex	Enable
12	Linkup	1000	Full Duplex	Disable
13	Linkup	1000	Full Duplex	Disable
14	Linkup	1000	Full Duplex	Enable
15	--	--	--	--
16	Linkup	1000	Full Duplex	Enable
SFP1	Linkup	1000	Full Duplex	Disable
SFP2	--	--	--	--

Figure 5-20 Port Status

- **Port Status:** Indicates whether the port is linked, not linked, or disabled.
- **Speed (Mbps):** Indicates the port speed with the unit of Mbps.
- **Duplex Mode:** Indicates the port duplex mode.
- **Flow Control:** Indicates whether flow control of the port is enabled or disabled.

5.3.2.4 Storm Control

This page contains the following fields:

Port	Trunk	Broadcast Control	Port	Trunk	Broadcast Control
1	--	Enable	2	--	Enable
3	--	Enable	4	--	Enable
5	T2	Disable	6	T2	Disable
7	--	Enable	8	--	Disable
9	--	Disable	10	--	Enable
11	--	Disable	12	--	Enable
13	--	Disable	14	--	Disable
15	--	Disable	16	--	Disable
SFP1	--	Enable	SFP2	--	--
All Ports	--	--			

Figure 5-21 Storm Control

- **Broadcast Control:** Enable or disable the broadcast control to limit the broadcast frames. Ports belong to the same Trunk should have the same value
- **Multicast Control:** Enable or disable the multicast control to limit the multicast frames, enabling multicast control will also enable broadcast control. All ports share the same setting
- **UL Control:** Enable or disable the UL control to limit the UL packets, enabling UL control will also enable broadcast control and multicast control. All ports share the same setting
- **Limit Rate:** Indicates the maximum rate (frames per second) at which the controlled packets configured above are forwarded. For the UL control, the unit is kilo frames per second, and the statistic is the sum of all ports. All ports share the same setting

5.3.2.5 Port Description

This page configures the description to indicate the ports.

Input description words in the Description field for each port. Notice that at most 15 letters or numbers can be held in each field.

Port	Description	Port	Description
1	<input type="text"/>	2	<input type="text"/>
3	TP-Link	4	<input type="text"/>
5	<input type="text"/>	6	<input type="text"/>
7	<input type="text"/>	8	<input type="text"/>
9	<input type="text"/>	10	<input type="text"/>

Notice: At most 15 letters or numbers can be held in the Description field.

Page

Figure 5-22 Port Description

5.3.3 Network Setting

This page contains the following topics: switch IP address, static MAC address, filtering MAC address, dynamic binding, bound MAC address, aging time and ping.

5.3.3.1 Switch IP Address

This page is showed as below:

Switch IP Address

MAC Address: 00-0A-EB-00-13-01

DHCP Client: Disable Enable

IP Address:

Netmask:

Default Gateway:

Notice: Switch may be disconnected after changing the IP address. Please make sure the switch IP address within the same subnet with your computer.

Figure 5-23 Switch IP Address

- **MAC Address:** Is firmred into switch in manufacturing process; it is sole and unchangeable.

- **DHCP Client:** Indicates whether the DHCP function is enabled. If DHCP client is enabled, the switch will obtain the IP address, netmask and default gateway from the DHCP server automatically; otherwise, these three items should be configured manually.
- **IP Address:** Is necessary for switch management. The configuration of switch IP address must be compliant with the subnet layout.
- **Default Gateway:** Serves as the default destination when a packet whose destination IP address is not within the switch's subnet is to be forwarded.



Notice:

- 1) When DHCP client is enabled, the IP parameters are obtained automatically from the DHCP server, so the "IP Address", "Netmask" and "Default Gateway" fields are disabled. These parameters can be queried on the DHCP server.
- 2) The initial state of the DHCP client is disabled and the initial IP address is 192.168.0.1.

5.3.3.2 Static MAC Address

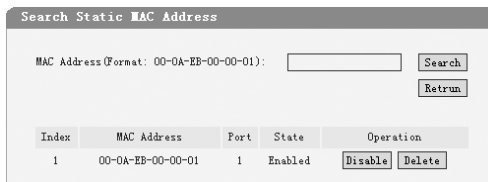
This page provides the function of adding, searching a static MAC address and changing the entry state, as shown in figure 5-24.

Index	MAC Address	Port	State	Operation
1	00-0A-EB-00-00-01	1	Enabled	Disable Delete

Figure 5-24 Static MAC address

A MAC address and its corresponding switch port should be provided when adding a static MAC address entry.

- **Search:** Input the MAC address in “Mac Address” field and click “Search” button. If that MAC address exists, the following page will display:



The screenshot shows a web interface titled "Search Static MAC Address". It features a text input field for "MAC Address (Format: 00-0A-EB-00-00-01):" with a "Search" button to its right and a "Return" button below it. Below the input field is a table with the following data:

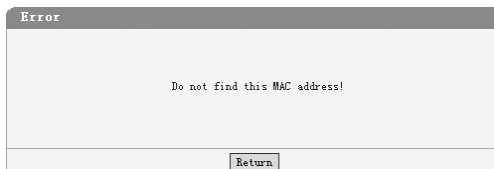
Index	MAC Address	Port	State	Operation
1	00-0A-EB-00-00-01	1	Enabled	Disable Delete

Figure 5-25 A Successful Searching

- **Index:** Stands for entry index of the MAC address in the table.
- **Port:** Stands for the switch port number.
- **State:** Indicates the entry in enabled state or disabled state.
- **Operation:** Provides the function of enabling, disabling or deleting an entry.
- **Return:** Return to the “Static MAC Address” page.

A search can also be executed in this page.

If the static MAC address isn't found in searching, then the following page will display:



The screenshot shows a web interface titled "Error". The main content area contains the text "Do not find this MAC address!". At the bottom of the page, there is a "Return" button.

Figure 5-26 A Failed Search

- **Add:** Input the MAC address in the “MAC Address” field and select a port number in “Corresponding Port” combo box, click the “Add” button, that MAC addresses may be added to the static MAC address table if the following conditions are met:
- 1) That MAC address doesn't exist in static MAC address;
 - 2) That MAC address doesn't exist in filtering MAC address;
 - 3) There is enough space in static MAC address table (the capacity of the static MAC address table is shown in “Appendix C”).

The static MAC address table is divided into several pages. At most 10 entries can be held in on page. The buttons “First”, “Previous” and “Next” can be used to browse the whole table.

**Notice:**

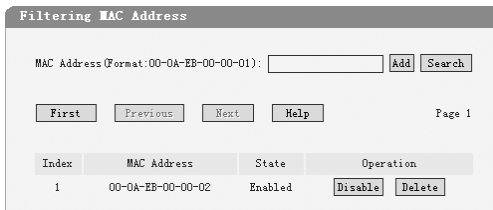
- 1) The capacity of the static MAC address is showed in “Appendix C”.
- 2) If an incorrect port number is selected when adding an entry, or the port number is modified unexpectedly later, then the entries must be renewed; otherwise, the packets cannot be forwarded correctly.
- 3) If a device, whose MAC address is added to static MAC address table, is connected to a wrong switch port (not the port configured in static MAC address entry), all the packets routing to the device cannot reach the device.
- 4) A MAC address cannot be added to static MAC address table and filtering MAC address table simultaneously.

5.3.3.3 Filtering MAC Address

All the packets taking the filtering MAC address as their destination are

discarded by the switch no matter which port they enter from.

This page provides the function of adding, searching a filtering MAC address and changing the entry state. The filtering MAC address entry is applicable to all switch ports. The operating instruments, which are similar to “Static MAC Address”, are omitted here.



Index	MAC Address	State	Operation
1	00-0A-EE-00-00-02	Enabled	<input type="button" value="Disable"/> <input type="button" value="Delete"/>

Figure 5-27 Filtering MAC Address

- **Index:** Indicates the entry index of filtering MAC address table.
- **MAC Address:** Indicates the filtering MAC address to be configured or to be searched.
- **State:** Indicates the entry in enabled state or disabled state.



Notice:

The capacity of filtering MAC address table is showed in “Appendix C”.

5.3.3.4 Dynamic Binding

This page provides the function of enabling or disabling dynamic binding.

If dynamic binding is disabled, the switch port learns MAC address unlimitedly (at most 8000 entries can be learned actually).

A switch port with dynamic binding enabled can bind a specified number of

MAC addresses. The MAC addresses bound by the switch port are always valid and won't age. If the specified number is reached, the port stops binding and transfers into secure state.

The bound MAC addresses can be queried in the “Bound MAC Address” page.

If the dynamic binding is disabled or the switch restarts, the bound MAC address entries are cleared.

There are 5 items in this page:

Port	Binding	Number of MAC Address To Bind	Number of Bound MAC Address	State
1	Disable	5	0	Free Port
2	Disable	5	0	Free Port
3	Disable	5	0	Free Port
4	Disable	5	0	Free Port
5	Disable	5	0	Free Port
6	Disable	5	0	Free Port
7	Disable	5	0	Free Port
8	Disable	5	0	Free Port
9	Disable	5	0	Free Port
10	Disable	5	0	Free Port
11	Disable	5	0	Free Port
12	Disable	5	0	Free Port
13	Disable	5	0	Free Port
14	Disable	5	0	Free Port
15	Disable	5	0	Free Port
16	Disable	5	0	Free Port
SFP1	--	--	--	--
SFP2	--	--	--	--
All Ports	--	--		

Notice: If dynamic binding is disabled, the port learns MAC address freely, otherwise, the port is restrained to learn(bind) the specified number of MAC address at most. If the bound number reaches the specified number, the port automatically transfers into secure state.

Figure 5-28 Dynamic Binding

➤ **Port:** Indicates switch port number.

- **Binding:** Three options are available. A further explanation is stated below.
- **Number of MAC Address to Bind:** Indicates the max number of MAC addresses that one switch port can bind.
- **Number of Bound MAC Address:** Indicates the number of MAC addresses that already bind to a switch port.
- **State:** Indicates the switch port state that may be binding, free port, secure port, unplugged or "--". A further explanation is stated below.



Further explanation

Options of dynamic binding:

- 1) **Disable:** Cause this port to learn MAC address freely.
- 2) **Enable:** Cause the port to bind MAC addresses until the specified number is reached.
- 3) **--:** This option is available only if the port is in secure state, when this option is selected, the port state keeps unchanged.

Port states:

- 1) **Free Port:** The binding function is disabled, and the port can learn MAC address freely.
- 2) **Binding:** The port is in binding state, and its bound MAC address number is still less than the max number.
- 3) **Secure Port:** The port has already bound the max number of MAC address in dynamic binding mode, or it was set to secure port manually in "Port Parameter" page.
- 4) **Unplugged:** The port is a SFP port and unplugged yet. The dynamic binding function cannot be configured now.
- 5) **--:** The port is a trunk member and its binding function cannot be configured.



Further Explanation

- 1) If the port is set to secure port manually in "Port Parameter " page, the dynamic binding cannot be configured here. If the port with dynamic binding enabled transfers into secure state automatically because the port has bound the specified number MAC address, the dynamic binding function of the port can be enabled or disabled again.
- 2) The combo box in "All Ports " entry is used to change the selections of corresponding combo boxes of all ports simultaneously.
- 3) A "Refresh" button is provided to look up the latest number of bound MAC address.



Notice:

If the switch port is a trunk member or an unplugged SFP port, the binding function of the port cannot be configured here.

5.3.3.5 Bound MAC Address

This page is showed as below:

Index	MAC Address	Port
1	00-0F-EA-25-D8-CA	13

Figure 5-29 Bound MAC Address

- **Index:** Indicates the entry index in dynamic binding MAC address table.
- **MAC Address:** Indicates MAC address already bound to the switch ports.
- **Port:** Indicates the switch port number corresponding to the bound MAC address.



Further Explanation

- 1) The bound MAC address table contains all the MAC addresses bound by the switch ports. Every entry contains one MAC address and its corresponding port number.
- 2) The bound MAC address table is divided into several pages. At most 10 entries can be held in one page. The buttons “First”, “Previous” and “Next” can be used to browse the whole table.

5.3.3.6 Aging Time

This page is showed as below:

Aging Time

Aging Time (0 - 630): seconds

Notice: MAC aging will be disabled if 0 is set.

Figure 5-30 Aging Time

- **Aging Time (0~630):** When a new MAC address is learned by the switch, it will be added to the dynamic MAC address table and a relative timer will be generated immediately. If no packet taking the MAC address as its source passes through the switch in a specified time length, that MAC address will be removed from the MAC address table. This process is called "aging", and the specified time length referred above is called "aging time".



Further Explanation

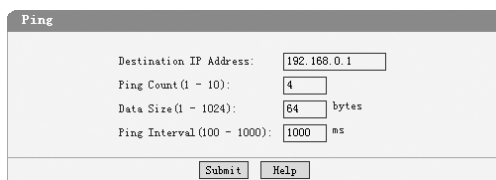
- 1) The aging time ranges from 0 to 630 seconds. An appropriate aging time should be configured here. An aging time that is too long lengthens

the time of the dynamic MAC address being deleted, further causes the packets being forwarded incorrectly. An aging time that is too short causes the table entries to be deleted quickly. Some packets have to be broadcasted because no corresponding entries can be abided by. The efficiency of forwarded packets is reduced.

- 2) The MAC addresses in static MAC address table, filtering MAC address table and bound MAC address table are free of the aging time.

5.3.3.7 Ping

The ping function is to test the connectedness of the link between the switch and destination. This page is shown below:



Destination IP Address:	<input type="text" value="192.168.0.1"/>
Ping Count(1 - 10):	<input type="text" value="4"/>
Data Size(1 - 1024):	<input type="text" value="64"/> bytes
Ping Interval(100 - 1000):	<input type="text" value="1000"/> ms

Figure 5-31 Ping

- **Destination IP Address:** Indicates the IP Address of the test destination.
- **Ping Count:** Indicates the ping times in one submission.
- **Data Size:** Indicates the data field length of ping packet.
- **Ping Interval:** Indicates the time interval between two continuous pings.

5.3.4 VLAN Setting

5.3.4.1 VLAN Mode

This page selects the VLAN Mode, possible field values are:

VLAN Mode

VLAN Mode:

VLAN Disable

Port VLAN (Port-based VLAN)

Tag VLAN (802.1Q Tag VLAN)

MTU VLAN

Notice: MTU VLAN mode is not able to be set if any Trunk has been set.

Submit Help

Figure 5-32 VLAN Mode

- **VLAN Disable:** Do not set any VLAN in the switch, all ports of the switch can communicate with each other.
- **Port VLAN (Port-Based VLAN):** Set the Port-Based VLAN mode.
- **Tag VLAN (802.1Q Tag VLAN):** Set the 802.1Q Tag VLAN mode.
- **MTU VLAN:** Set the MTU VLAN mode. This mode cannot be set if any Trunk has been set.

5.3.4.2 Port VLAN Setting

This page display when the switch is in Port VLAN mode, it contains the following fields:

Port VLAN Setting

VLAN: 1

Port Member	Description	Port Member	Description
1	TF-Link	2	----
3	----	4	----
5	----	6	----
7	----	8	----
9	----	10	----
11	----	12	----
13	----	14	----
15	----	16	----
SFP1	----	SFP2	----
T1	----	T2	----
T3	----	T4	----

All VLAN Select All Clean Up Submit Help

Figure 5-33 Port VLAN Setting

- **VLAN:** The VLAN number. Select the number of the VLAN you want to configure here.
- **Port:** The switch port number.
- **Member:** Select the member of the VLAN here. If this field is checked, it indicates the port belongs to the current VLAN.
- **Description:** Displays the user-defined port description.
- **All VLAN:** Displays all defined Port VLANs.



VLAN	Member
1	5, 6, 7, 8, 9, 10, 11, 16, SFP1, T1,
2	3, 4, 16, SFP1,

Figure 5-34 All Port VLAN

- **Select All:** Select all ports to be VLAN members.
- **Clean Up:** Clean up all members of the VLAN.
- **Submit:** Submit to buildup a VLAN with the selected members.



Notice:

- 1) Any VLAN cannot be the subset or superset of other VLANs.
- 2) At least two port members should be included to add a VLAN group. (If the page is submitted with 0 VLAN member, it indicates to delete the VLAN.)
- 3) If any Trunk has been set, the Trunk can be configured as a VLAN member, and the member ports of the Trunk cannot be configured (see Port 1 and 2 in the figure for example).
- 4) For the first time the Port VLAN mode is set, a default VLAN, which is indexed as NO. 1 and contains all switch ports, will be built up.
- 5) The ports haven't been assigned to any VLAN manually will be assigned to a hidden VLAN automatically to make sure they can communicate with

each other.

- 6) The number of Port VLAN can be set is the same as the switch port number.

5.3.4.3 Tag VLAN Global Setting

This page displays when the switch is in Tag VLAN mode, the global setting of the ports will affect all Tag VLANs. It contains the following fields:

Tag VLAN Global Setting					
Port	PVID	Untag Frame	Port	PVID	Untag Frame
1	101	Drop	2	101	Drop
3	1	Pass	4	1	Drop
5	1	Pass	6	1	Pass
7	1	Drop	8	1	Drop
9	1	Pass	10	1	Drop
11	11	Pass	12	11	Pass
13	13	Pass	14	14	Pass
15	0	--	16	11	Pass
SFP1	12	Pass	SFP2	0	--
T1	101	Drop	T2	0	--
T3	0	--	T4	0	--
All Ports		--			

Figure 5-35 Tag VLAN Global Setting

- **Port:** The switch port number.
- **PVID:** while receiving an untagged frame from the port, the switch will assign a tag to the frame, using the PVID of the port as its VID.
- **Untag Frame:** The solution to the untagged frame received. "Drop" will drop the frame and "Pass" will transmit the frame in the VLAN with the VID the same as the PVID of the port.
- **All Ports:** By operating on this field expediently, you can set the values of all ports in the corresponding field.

**Notice:**

If any Trunk has been set, the Trunk can be configured, but member ports of the Trunk are not able to be configured and in the fields it displays the parameters of the Trunk they belong to. (see port1 and 2 in the figure for example).

5.3.4.4 Tag VLAN Setting

This page displays when the switch is in Tag VLAN mode, it configures each VLAN and is affected by the global setting of the ports, it contains the following fields:

Tag VLAN Setting

VLAN: VLAN ID (1 - 4094) :

Port	Member	Egress Frame	Description
1	<input type="checkbox"/>	---	----
2	<input type="checkbox"/>	---	----
3	<input type="checkbox"/>	Drop Tag	----
4	<input type="checkbox"/>	Drop Tag	----
5	<input checked="" type="checkbox"/>	Add Tag	----
6	<input checked="" type="checkbox"/>	Drop Tag	----
7	<input checked="" type="checkbox"/>	Drop Tag	----
8	<input checked="" type="checkbox"/>	Drop Tag	----
9	<input checked="" type="checkbox"/>	Add Tag	----
10	<input checked="" type="checkbox"/>	Add Tag	----
11	<input type="checkbox"/>	Drop Tag	----
12	<input type="checkbox"/>	Drop Tag	----
13	<input checked="" type="checkbox"/>	Drop Tag	----
14	<input checked="" type="checkbox"/>	Add Tag	----
15	<input type="checkbox"/>	---	----
16	<input type="checkbox"/>	Drop Tag	----
SFP1	<input checked="" type="checkbox"/>	Drop Tag	----
SFP2	<input type="checkbox"/>	---	----
T1	<input checked="" type="checkbox"/>	Add Tag	----
T2	<input type="checkbox"/>	---	----
T3	<input type="checkbox"/>	---	----
T4	<input type="checkbox"/>	---	----
All Ports		---	----

Figure 5-36 Tag VLAN Setting

- **VLAN:** The VLAN number. Select the number of the VLAN you want to configure here.

- **VLAN ID:** configure the VLAN ID.
- **Port:** The switch port number.
- **Member:** Select the member of the VLAN here. If this field is checked, it indicates that the port belongs to the current VLAN.
- **Egress Frame:** The solution to the egress frame. "Drop Tag" indicates drop the tag header before sending the frame. "Add Tag" indicates add the tag header before sending the frame.
- **Description:** Display the user-defined port description.
- **All Ports:** By operating on this field expediently, you can set the values of all ports in the corresponding field.
- **All VLAN:** Display all defined Tag VLANs.

All Tag VLAN		
VLAN	VID	Member
2	22	5, 6, 7, 8, 9, 10, 11, 14, 16, SFP1, T1,
10	4000	3, 4, 14, 16, SFP1,

Figure 5-37 All Tag VLAN

- **Select All:** Select all ports to be VLAN members.
- **Clean Up:** Clean up all members of the VLAN.
- **Submit:** Submit to buildup a VLAN with the selected members.

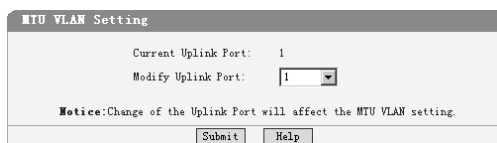
**Notice:**

- 1) VID of the VLAN must be unique and within the range of 1 to 4094.
- 2) At least two port members should be included to add a VLAN group. (If the page is submitted with 0 VLAN member, it indicates to delete the VLAN.)
- 3) If any Trunk has been set, the Trunk can be configured as a VLAN member and member ports of the Trunk cannot be configured (see Port 1 and 2 in the figure for example).

- 4) If the port is connected to a device that doesn't support IEEE802.1Q (e.g. HUB and some network adapter), value of the Egress Frame field should be set to "Drop Tag".
- 5) For the first time the Port VLAN mode is set, a default VLAN, which is indexed as NO. 1 and contains all switch ports, will be built up.
- 6) The ports haven't been assigned to any VLAN manually cannot communicate with each other or other VLAN. That's different from the Port VLAN.
- 7) The number of Port VLAN can be set depends on the switch type. See the Appendix C for details.

5.3.4.5 MTU VLAN Setting

This page, which is designed to configure the uplink port, display when the switch is in MTU VLAN mode.



MTU VLAN Setting

Current Uplink Port: 1

Modify Uplink Port: 1

Notice: Change of the Uplink Port will affect the MTU VLAN setting.

Submit Help

Figure 5-38 MTU VLAN Setting



Notice:

- 1) The uplink port will buildup several VLANs with each of the other ports. Each VLAN contains two ports, the uplink port and one of the other ports in the switch, so the uplink port can communicate with any other port but other ports can't communicate with each other.
- 2) The first time the MTU VLAN mode is set, it set port 1 to be the uplink port by default.

5.3.5 Port Trunking

This page contains the following fields:

Trunk	Member			
1	<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input checked="" type="checkbox"/> 4
2	<input checked="" type="checkbox"/> 5	<input checked="" type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8
3	<input checked="" type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11	<input type="checkbox"/> 12
4	<input type="checkbox"/> 13	<input type="checkbox"/> 14	<input type="checkbox"/> 15	<input type="checkbox"/> 16

Notice:Trunks can not be set if the switch is in MTU VLAN mode.

Figure 5-39 Port Trunking

- **Trunk:** The Trunk number.
- **Member:** Select the member of the Trunk here. Each group has 4 optional ports to compose a Trunk.
- **Select All:** Select all Trunk members in the list.
- **Clean Up:** Clean up the Trunk member list.



Notice:

- 1) Each Trunk should contain 2 to 4 ports (If a Trunk is submitted with 0 member port, it indicates to delete the Trunk).
- 2) Trunks cannot be set if the switch is in MTU VLAN mode.

5.3.6 Priority Setting

Priority setting contains four topics: priority mode, port-based priority, port default priority and 802.1p priority.

Because dynamic menu is adopted, only the pages corresponding to current priority mode are revealed. If the parameters of other priority mode are to be configured, select the corresponding priority mode in "Priority Mode" page first.

5.3.6.1 Priority Mode

This page is showed as below:

Figure 5-40 Priority Mode

- **Priority Mode:** Contains “Disable”, “Port-Based” and “IEEE802.1p”.
- **Priority Rule:** Contains “Weighted” and “Fixed”. If the priority mode is set to “Disable”, the priority rule cannot be configured.

5.3.6.2 Port-Based Priority

This page is revealed when the “Port-Based” mode is configured. As shown below:

Port	Priority Class	Port	Priority Class
1	Lowest	2	Lowest
3	Lowest	4	Lowest
5	Lowest	6	Lowest
7	Lowest	8	Lowest
9	Lowest	10	Lowest
11	Lowest	12	Lowest
13	Lowest	14	Lowest
15	Lowest	16	Lowest
SFP1	--	SFP2	--

Figure 5-41 Port-Based priority

- **Port:** Indicates the switch port number.
- **Priority Class:** In port-based priority mode, the switch ports are classified into four priority classes: lowest, lower, higher and highest. All the packets

entering from the port of the switch are forwarded in the corresponding priority queue.



Further Explanation

When priority rule is configured as "weighted", a 1,2,4,8 weighting is applied to forward these four classes of packets.

5.3.6.3 Port Default Priority

This page is revealed when the "IEEE802.1p" mode is configured. When a switch port receives an untagged frame (a frame without priority tag), the port's default priority tag will be inserted into the frame before any other process.

Port Default Priority			
Port	Default Priority Tag	Port	Default Priority Tag
1	0	2	0
3	0	4	0
5	0	6	0
7	0	8	0
9	0	10	0
11	0	12	0
13	0	14	0
15	0	16	0
SFP1	--	SFP2	--

Figure 5-42 Port Default Priority

- **Port:** Indicates the switch port number.
- **Default Priority Tag:** Indicates 802.1p tag being inserted into untagged frames.

5.3.6.4 802.1p Priority Class

This page is revealed when the "IEEE802.1p" mode is configured. As shown below:

Priority tag	Corresponding Priority Class
0	Lowest
1	Lowest
2	Lower
3	Lower
4	Higher
5	Higher
6	Highest
7	Highest

Submit Help

Figure 5-43 802.1p Priority

- **Priority Tag:** The priority tag defined in IEEE802.1p.
- **Corresponding Priority Class:** Indicates the inner priority classes of switch. The tagged frames are classified into four classes inside the switch: lowest, lower, higher and highest. When the “Weighted” priority rule is configured, a 1,2,4,8 weighting is applied to forward these four classes of packets.



Further explanation

In IEEE802.1p priority mode, when a switch port receives an untagged frame (a frame without priority tag), the port's default priority tag will be inserted into the frame before any other process.

5.3.7 Port Mirroring

This page contains the following fields:

Port Mirroring	
Mirror Mode: <input type="text" value="Ingress"/>	Mirror Port: <input type="text" value="3"/>
Mirrored Port	
<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 4
<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6
<input type="checkbox"/> 7	<input type="checkbox"/> 8
<input type="checkbox"/> 9	<input type="checkbox"/> 10
<input type="checkbox"/> 11	<input type="checkbox"/> 12
<input type="checkbox"/> 13	<input type="checkbox"/> 14
<input type="checkbox"/> 15	<input type="checkbox"/> 16
<input type="checkbox"/> SFP1	<input type="checkbox"/> SFP2

Clean Up Submit Help

Figure 5-44 Port Mirroring

- **Mirror Mode:** You can set the mirror mode to monitor the ingress traffic, egress traffic, or both traffic. You can also disable the port mirroring.
- **Mirror Port:** Defines the port to monitor the traffic, Trunk member can't define here.
- **Mirrored Port:** Indicates the port from which the packets are mirrored, Trunk member can't define here. At most 4 ports can be mirrored simultaneously.
- **Clean Up:** Clean Up the Mirrored Port list.

**Notice:**

- 1) Trunk member port can be neither Mirror Port nor Mirrored Port.
- 2) The Mirror Port can't be the Mirrored Port at the same time.
- 3) At most 4 Mirrored Ports can be set.
- 4) If a 100M SFP module is installed, it can't be the Mirror Port. If it has been configured as the Mirror Port before, please modify it.

5.3.8 Virtual Cable Test

The virtual cable test feature lets you test the continuity of the cable circuit. It contains the following fields:

Test Report	
Link Status:	Good
Link Length:	110 - 140 m
Fault Distance:	--

Figure 5-45 Virtual Cable Test

- **Test Port:** Select the port you want to test.

- **Link Status:** Reports good status or issues such as cable opens, cable shorts or any impedance mismatch in the cable.
- **Link Length:** Reports the range of the cable length if the link status is good.
- **Fault Distance:** Reports the distance to the open/short location.
- **Test:** Test the cable via the selected port.

**Notice:**

Cable connected to the SFP cannot be tested.

Appendix A Pin Explain For RJ-45 Connector

The switching port can connect to stations wired in standard RJ-45 Ethernet station mode using straight cables. Transmission devices connected to each other use crossed cables. The following figure illustrates the pin allocation:



Figure RJ-45 connector

The following shows the way to make the cable use to connect switch to network adapter, and cable use to connect switch to switch/hub/bridge.

Pin signal allocation for RJ-45 connector		
Pin	MDI-II	MDI-X
1	TX+ (send)	RX+ (receive)
2	TX- (send)	RX- (receive)
3	RX+ (receive)	TX+ (send)
4	No use	No use
5	No use	No use
6	RX- (receive)	TX- (send)
7	No use	No use
8	No use	No use

Straight cable: use to connect switch (uplink port) or network adapter to switch/hub/other device (normal port).

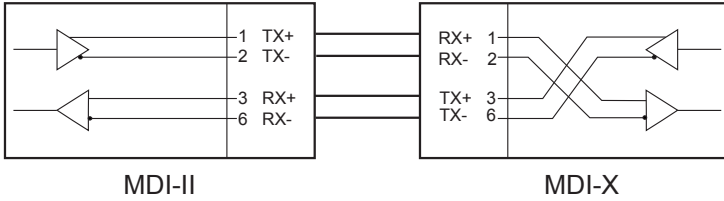


Figure straight cable

Crossed cable: use to connect switch (normal port) to switch/hub/other device(normal port).

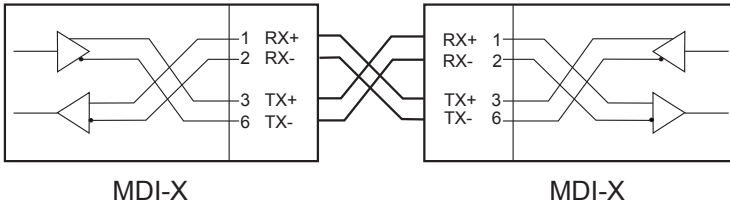


Figure crossed cable

Appendix B Table of Factory Defaults

Table of Factory Defaults:

System Setting	System Information	System Name	Null
		System Location	Null
		Contact Information	Null
	File Transfer	Transfer Type	System Upgrading
		File Name	SysSG2216WEB.bin
	User	User Name	supervisor
Password		supervisor	
Port Setting	Port Parameter	Port Status	Enable
		Port Security	Disable
		Flow Control	Disable
		Duplex Mode	Auto
	Port Statistic	All	0
	Storm Control	Broadcast Control	Disable
		Multicast Control	Disable
		UL Control	Disable
		Limit Rate	64K
Port Description	Null		
Network Setting	Switch IP Address	DHCP client	Disable
		IP Address	192.168.0.1
		Netmask	255.255.255.0
		Default Gateway	Null
	Static MAC Address	Null	
	Filtering MAC Address	Null	
	Dynamic Binding	Binding	Disable
		Number of MAC Address to Bind	5
	Bound MAC Address	Null	

Network Setting	Aging Time	Aging Time	300
	Ping	Destination IP Address	192.168.0.1
		Ping Count	4
		Data Size	64
		Ping Interval	1000
VLAN Setting	VLAN Mode	Disable	
	Port VLAN Setting	All ports belong to VLAN 1	
	Tag VLAN	PVID	1
		Global Setting	Untag Frame
	Tag VLAN Setting	All ports belong to VLAN 1; the VID is 1 and "Egress Frame" is "Drop Tag"	
	MTU VLAN Setting	Uplink port	1
Port Trunking	No configured Trunk		
Priority Setting	Priority Mode	Priority Mode	Disable
		Priority Rule	Weighted
	Port-Based Priority	Priority Class	Lowest
	Port Default Priority	Port Default Priority Tag	0
	802.1P Priority	Priority Tag 0,1	Lowest
		Priority Tag 2,3	Lower
		Priority Tag 4,5	Higher
Priority Tag 6,7		Highest	
Port Mirroring	Port Mirroring	Mirror Mode	Disable
		Mirror Port	1
		Mirrored Port	Null

Appendix C Table of Function Differences of Switch Family

Table of Function Differences of Switch Family

Function	Models	
	TL-SG2216WEB	TL-SG2224WEB
Port	16	24
Giga Port	16	24
SFP Port	2	2
Trunk	4	6
Port VLAN	16	24
Tag VLAN	256	256
Static MAC	128	128
Filtering MAC	128	128
Dynamic Binding MAC	192	240
Power Consumption	35W MAX	35W MAX



TP-LINK®

TP-LINK TECHNOLOGIES CO., LTD.

E-mail: support@tp-link.com

Website: <http://www.tp-link.com>

Add: Fl.3,Bldg.R1-B,High-Tech Industrial Park, Shenzhen Road, Shenzhen,China